

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of : Before the Board of Appeals
Masaya Iwamoto : Appeal No.:
Serial No.: 10/641,013 : Group No.: 1754
Filed: August 15, 2003 : Examiner: N. Nguyen
: Confirm. No.: 8882

For: METHOD FOR TREATING AN ORGANIC GAS

August 7, 2007

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For: METHOD FOR TREATING AN ORGANIC GAS

APPEAL BRIEF

U.S. Patent and Trademark Office
via e-filing
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Date: August 7, 2007

Sir:

In response to the Final Office Action dated October 11, 2006, and further responsive to the Notice Of Appeal filed on April 11, 2007, the period for response having been extended two (2) months to August 11, 2007, this corresponding Appeal Brief is respectfully submitted.

I. REAL PARTY IN INTEREST

This application is assigned to Oki Electric Industry Co., Ltd., which is the real party in interest.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences that may be related to, that would directly affect or be directly affected by, or have a bearing on the Board's decision in this pending appeal.

III. STATUS OF THE CLAIMS

Claims 1-14 (canceled).

Claims 15-22 (rejected).

Claims 15-22 have been finally rejected. Accordingly, the rejection of claims 15-22 is being appealed.

IV. STATUS OF AMENDMENTS

Subsequent to the Final Office Action dated October 11, 2006, Appellant submitted an Amendment dated January 11, 2007, canceling claims 1-3, 5, 10-12 and 14. Claims 21 and 22 were amended to be in independent form. Claims 15-20 were maintained as previously pending without amendment.

In the Advisory Action dated February 12, 2007, the Amendment dated January 11, 2007, was deemed in non-compliance with 37 C.F.R. 1.121, and also was not entered as allegedly raising new issues that would require at least further consideration.

A Supplemental Amendment was filed on February 16, 2007, as in compliance with 37 C.F.R. 1.121. Claims 1-3, 5, 10-12 and 14 were again canceled, and claims 21

and 22 were amended to be in independent form. Claims 15-20 were maintained as previously pending without amendment.

As indicated in the Advisory Action dated April 9, 2007, the Amendment dated April 11, 2007 is to be entered for purposes of Appeal.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention relates to a method for treating an organic exhaust gas.¹

The method for eliminating a harmful substance from an organic exhaust gas as broadly featured in independent claim 15 includes in combination providing the organic exhaust gas including the harmful substance (e.g., page 13, lines 11-15 and page 17, lines 5-7, 230 and 240 as shown in Fig. 2); contacting the organic exhaust gas with a treating liquid (260 in Fig. 2) so as to dissolve the harmful substance into the treating liquid (260) and provide treated exhaust gas (e.g., page 13, line 30 through to page 14, line 10, 233 and 212 in 210 as shown in Fig. 2); providing a biological filter medium (221 in Fig. 2) supporting bacteria, the biological filter medium (221) having opposite first and second surfaces (e.g., page 14, lines 24-26, 221 in 220 as shown in Fig. 2);

¹ In the description to follow, citations to various reference numerals, figures and corresponding text in the specification are provided solely to comply with Patent Office rules. It should be understood that these reference numerals, figures, and text are exemplary in nature, and not in any way limiting of the true scope of the claims. It would therefore be improper to import anything into any of the claims simply on the basis of exemplary language that is provided here only under the obligation to satisfy Patent Office rules for maintaining an Appeal.

and supplying the treating liquid (260) containing the harmful substance to the biological filter medium (221) from opposite first and second directions to the opposite first and second surfaces, so that the harmful substance is biochemically degraded by the bacteria supported by the biological filter medium (221) (e.g., page 14, line 26 through to page 15, line 3, 234 and 238 in 220 as shown in Fig. 2).

As broadly featured in dependent claim 20, the method further comprises supplying bubbled air throughout the biological filter medium (221) (e.g., page 15, lines 7-12, 235 in 220 as shown in Fig. 2).

As broadly featured in independent claim 21, the method for treating an organic exhaust gas includes in combination generating an organic exhaust gas containing a harmful substance (e.g., page 13, lines 11-15 and page 17, lines 5-7, 230 and 240 as shown in Fig. 2); providing a treating liquid (260 in Fig. 2); contacting the organic exhaust gas with the treating liquid (260 in Fig. 2) so as to dissolve the harmful substance into the treating liquid (260) and provide treated exhaust gas (e.g., page 13, line 30 through to page 14, line 10, 233 and 212 in 210 as shown in Fig. 2); contacting bacteria (221 in Fig. 2) with the treating liquid containing the harmful substance so that the harmful substance is biochemically degraded (e.g., page 14, lines 24-26 and page 16, lines 25-28, 221 in 220 as shown in Fig. 2); contacting the treated exhaust gas with an active carbon (213 in Fig. 2) so as to absorb the harmful substance remaining in the treated exhaust gas into the active carbon (e.g., page 13, lines 8-10 and page 17, lines 12-16, 213 in 210 as shown in Fig. 2); and supplying bubbled air to the bacteria (221)

(e.g., page 17, lines 7-12 and 22-23, 235 in 220 as shown in Fig. 2).

As broadly featured in independent claim 22, a method for eliminating a harmful substance from an organic exhaust gas includes in combination providing the organic exhaust gas including the harmful substance (e.g., page 13, lines 11-15 and page 17, lines 5-7, 230 and 240 as shown in Fig. 2); contacting the organic exhaust gas with a treating liquid (260 in Fig. 2) so as to dissolve the harmful substance into the treating liquid (260) and provide treated exhaust gas (e.g., page 13, line 30 through to page 14, line 10, 233 and 212 in 210 as shown in Fig. 2); preparing carriers supporting bacteria (221 in Fig. 2); contacting the carriers with the treating liquid (260 in Fig. 2) containing the harmful substance so that the harmful substance is biochemically degraded by the bacteria supported by the carriers (e.g., page 14, lines 24-26, 221 in 220 as shown in Fig. 2); contacting the treated exhaust gas with an active carbon (213 in Fig. 2) so as to absorb the harmful substance remaining in the treated exhaust gas into the active carbon (e.g., page 13, lines 8-10 and page 17, lines 12-16, 213 in 210 as shown in Fig. 2); and supplying bubbled air to the carriers (221) supporting the bacteria (e.g., page 17, lines 7-12 and 22-23, 235 in 220 as shown in Fig. 2).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The issues on Appeal are:

(1) The rejection of claims 15-22 under 35 U.S.C. 103(a) as being unpatentable over the Safi reference (U.S. Patent No. 5,681,470) in view of the Shiba et al. reference

(U.S. Patent No. 6,423,534).

VII. **ARGUMENTS**

(1) Claims 15-22 are patentable over the combination of the Safi reference in view of the Shiba et al. reference

Claims 15-22 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Safi reference in view of the Shiba et al. reference. This rejection is respectfully traversed for at least the following reasons.

Claims 15-19

The method for eliminating a harmful substance from an organic exhaust gas of claim 15 includes in combination among other features "providing a biological filter medium supporting bacteria, the biological filter medium having opposite first and second surfaces"; and "supplying the treating liquid containing the harmful substance to the biological filter medium from opposite first and second directions to the opposite first and second surfaces, so that the harmful substance is biochemically degraded by the bacteria supported by the biological filter medium". Appellant respectfully submits that the method for eliminating a harmful substance from an organic exhaust gas of claim 15 would not have been obvious in view of the prior art as relied upon by the Examiner for at least the following reasons.

Initially, Appellant emphasizes that claim 15 as pending was not addressed in

the Final Office Action dated October 11, 2006. In the Final Office Action dated October 11, 2006, claims 1-3, 5, 10-12 and 14-22 were addressed and rejected collectively, only in a general manner. Independent claim 15 as presented in the preceding Amendment dated July 12, 2006, was not specifically addressed. The comments as made of record with respect to claims 15-20 on pages 19-22 of the Amendment dated July 12, 2006, were not addressed in the Final Office Action dated October 11, 2006, and thus presumably were not considered by the Examiner. Particularly, the arguments as presented in the first and second full paragraphs on page 20 of the Amendment dated July 12, 2006, were not addressed in the Final Office Action dated October 11, 2006. The specific features of claim 15 were not addressed in the Final Office Action dated October 11, 2006.

As set forth in Manual of Patent Examining Procedure Section 706.07, before final rejection is in order, a clear issue should be developed between the examiner and applicant. Clear issues between applicant and examiner should be developed, if possible, before appeal. As further set forth in Manual of Patent Examining Procedure Section 707.07(f), where the applicant traverses any rejection, the examiner should, if he or she repeats the rejection, take note of applicant's argument and answer the substance of it. If it is the examiner's considered opinion that the asserted advantages are not sufficient to overcome the rejection of record, he or she should state the reasons for his or her position in the record, preferably in the action following the assertion or argument relative to such advantages. By doing so, the applicant will know

that the asserted advantages have actually been considered by the examiner and, if appeal is taken, the Board of Patent Appeals and Interferences will also be advised.

Appellant respectfully submits that the Final Office Action dated October 11, 2006, is incomplete and thus improper, because claim 15 as presented in the preceding Amendment dated July 12, 2006, was not addressed. The record with respect to this application and prosecution thereof is thus incomplete and unclear. Appellant has been denied full and fair hearing, in that clear issues have not been developed prior to Appeal.

Returning to the substance of the prior art rejection of claim 15, Appellant respectfully submits that the prior art as relied upon does not disclose or make obvious supplying treating liquid containing a harmful substance to a biological filter medium from opposite first and second directions, to opposite first and second surfaces of the biological filter medium supporting bacteria, as would be necessary to make obvious the features of claim 15.

The Examiner has primarily relied upon the Safi reference, which includes anaerobic bioreactor 14 as shown generally in Fig. 1. Bioreactor 14 is shown in greater detail in Figs. 2 and 3 of the Safi reference. As described beginning in column 5, line 55 of the Safi reference with respect to Fig. 2, the bioreactor includes a container 32 having a single inlet line 28 for providing an aqueous stream to the bioreactor for treatment. An intermediate horizontal plate 34 is provided as having a bed 38 of microorganisms thereon. Also, a second bed of microorganisms rests on the bottom 56

of container 32 (column 6, lines 14-16 of the Safi reference).

As further described beginning in column 6, line 17 of the Safi reference with respect to Fig. 2, in operation bioreactor 14 receives an aqueous stream to be treated via inlet line 28, whereby the aqueous stream reacts with the microorganisms resting on bottom 56 of container 32. Continuous flow of pumped liquid in container 32 causes the aqueous stream and biogas to pass through aperture 36 to upper compartment 40, where the aqueous stream again reacts with second bed 38 of microorganisms on intermediate horizontal plate 34. Blockage element 48 acts as a check valve to prevent backflow of aqueous stream and microorganisms from upper compartment 40 to lower compartment 42.

Appellant respectfully submits that the Safi reference as primarily relied upon by the Examiner does not disclose or even remotely suggest supplying treating liquid containing a harmful substance to a biological filter medium from opposite first and second directions, to opposite first and second surfaces of the biological filter medium, as would be necessary to meet the features of claim 15. This should be readily clear, because only a single inlet line 28 is shown for bioreactor container 32 in Fig. 2 of the Safi reference. The Shiba et al. reference as secondarily relied upon also fails to disclose or suggest supplying treating liquid from opposite first and second directions, to opposite first and second surfaces of a biological filter medium, and thus clearly would provide no motivation to modify the primarily relied upon Safi reference to make obvious the features of claim 15.

On page 2 of the Advisory Action dated April 9, 2007, the following comments have been provided of record by the Examiner regarding claim 15:

"It also should be noted that even if the dead bacteria can be removed by injecting the treating liquid from the nozzle portions of the up-flow washing nozzles as alleged by Applicants, there is no evidence to show that such feature will have an effect on the process itself. Also, in claim 15, the direction of the treating liquid is "from opposite first and second directions to the opposite first and second surfaces", which does not clearly require that the direction is an upward flow because in Applicants' specification, "opposite direction" is defined as "upside, upward or top", but there is no definition for "opposite first and second directions".

Appellant firstly addresses the Examiner's assertion that there is no evidence that the features of claim 15 will have an effect on the process itself. As described beginning on page 14, line 30 of the present application with respect to Fig. 2, treating liquid 260 stored in treating liquid tank 211 is supplied to the top of biological filter medium 221 from an upside thereof, via pipeline 238. As further described beginning on page 15, line 15 of the present application, up-flow washing nozzle 234 makes it possible to inject the treating liquid upward from nozzle portions thereof, to the bottom of biological filter medium 221. As specifically described beginning on page 15, line 20 of the present application, it is therefore possible to also remove adhered dead bacteria by injecting treating liquid from the nozzle portion of the up-flow washing nozzles 234.

As further described, air permeability of the biological filter medium 221 can be secured by means of the up-flow washing nozzles 234. Accordingly, stable growth and multiplication of aerobic microbes are obtainable, while the ability to treat harmful substances and other organic contents by biochemical degradation can be kept constant.

Accordingly, contrary to the Examiner's assertion in the Advisory Action dated April 9, 2007, the features of claim 15 will have effect on the process itself. That is, supplying treating liquid from opposite first and second directions, to opposite first and second surfaces of the biological filter medium, helps to remove adhered dead bacteria from the biological filter medium, so that air-permeability of the biological filter medium is secured and so that stable growth and multiplication of aerobic microbes are obtainable to maintain constant biochemical degradation.

Bioreactor 14 in the Safi reference is an anaerobic bioreactor. Thus, the Safi reference clearly is not concerned with securing air permeability of a biological filter medium to promote stable growth and multiplication of aerobic microbes.

With further regard to the Advisory Action dated April 9, 2007, the Examiner has apparently asserted that claim 15 is indefinite, because opposite first and second directions are not defined. However, Appellant respectfully emphasizes that claims 15-22 currently are not rejected under 35 U.S.C. 112, second paragraph, and are thus presumed definite. Moreover, when taken in light of the description and the drawings, one of ordinary skill would readily understand "opposite first and second directions",

particularly in view of Fig. 2 of the present application. Appellant thus respectfully submits that the above noted comments regarding claim language on page 2 of the Advisory Action dated April 9, 2007, should be withdrawn.

Appellant respectfully submits that the method for eliminating a harmful substance from an organic exhaust gas of claim 15 would not have been obvious in view of the prior art as relied upon by the Examiner taken singularly or together, and that this rejection, insofar as it may pertain to claims 15-20, is improper for at least these reasons.

Claim 20

Claim 20, as dependent upon claim 15, features that the method for eliminating a harmful substance further comprises "supplying bubbled air throughout the biological filter medium".

Initially, Appellant emphasizes that claim 20 as presented in the Amendment dated July 12, 2006, has not been addressed in the Final Office Action dated October 11, 2006. Claim 20 also has not been addressed in either the Advisory Action dated February 12, 2007, or the Advisory Action dated April 9, 2007. The grounds for rejection of claim 20 are not of record, and are thus unclear. **Appellant respectfully submits that the record with respect to prosecution of this application is unclear, that Appellant has been denied full and fair hearing, and that the Final Office Action dated October 11, 2006, is incomplete and thus Improper.**

Regarding claim 20, as asserted in the paragraph bridging pages 20 and 21 of the Amendment dated July 12, 2006, Appellant respectfully submits that the prior art as relied upon by the Examiner does not disclose or suggest a method of eliminating a harmful substance, further including in combination supplying bubbled air to a biological filter medium. As described on page 15, lines 22-25 of the present application, when aerobic microbes are used as bacteria, air is supplied to the aerobic microbes, at the same time that air-permeability of the biological filter medium is secured by injecting treating liquid to the biological filter medium in an up-flow washing process. This helps to provide stable growth and multiplication of aerobic microbes. Bioreactor container 32 as shown in Fig. 2 of the primarily relied upon Safi reference is not described or suggested as having bubbled air supplied throughout the beds of microorganisms situated on intermediate horizontal plate 34, or the bottom 56 of container 32. This should be especially clear, because bioreactor 14 of the Safi reference is anaerobic, whereby microorganisms do not require oxygen. The Shiba et al. reference as secondarily relied upon also fails to disclose supplying bubbled air, and thus would provide no motivation to modify the process of the Safi reference to make obvious the features of claim 20. Appellant therefore respectfully submits that the method for eliminating a harmful substance of claim 20 would not have been obvious in view of the prior art as relied upon by the Examiner taken singularly or together, and that this rejection of claim 20 is improper for at least these reasons, in addition to the reasons as set forth above with respect to claim 15.

Claim 21

The method for treating an organic exhaust gas of claim 21 includes in combination among other features "contacting bacteria with the treating liquid containing the harmful substance so that the harmful substance is biochemically degraded", and "supplying bubbled air to the bacteria".

Appellant respectfully submits that the prior art as relied upon by the Examiner does not disclose or make obvious the above noted features of claim 21. Bioreactor container 32 in Fig. 2 of the primarily relied upon Safi reference is not described as supplying bubbled air to the beds of microorganisms disposed on intermediate horizontal plate 34, and the bottom 56 of container 32. Bioreactor 14 of the Safi reference is anaerobic. The Shiba et al. reference as secondarily relied upon also fails to disclose supplying bubbled air, and thus would provide no motivation to modify the process of the Safi reference to make obvious the features of claim 21. Appellant therefore respectfully submits that the method for treating an organic exhaust gas of claim 21 would not have been obvious in view of the prior art as relied upon by the Examiner taken singularly or together, and that this rejection of claim 21 is improper for at least these reasons.

Claim 22

The method for eliminating a harmful substance form an organic exhaust gas of claim 22 includes in combination among other features "contacting the carriers with the

treating liquid containing the harmful substance so that the harmful substance is biochemically degraded by the bacteria supported by the carriers", and "supplying bubbled air to the carriers supporting the bacteria".

Appellant respectfully submits that the prior art as relied upon by the Examiner does not disclose or make obvious the above noted features of claim 22. Bioreactor container 32 in Fig. 2 of the primarily relied upon Safi reference is not described as supplying bubbled air to the beds of microorganisms disposed on intermediate horizontal plate 34, and the bottom 56 of container 32. Bioreactor 14 of the Safi reference is anaerobic. The Shiba et al. reference as secondarily relied upon also fails to disclose supplying bubbled air, and thus would provide no motivation to modify the process of the Safi reference to meet the features of claim 22. Appellant therefore respectfully submits that the method for eliminating a harmful substance from an organic exhaust gas of claim 22 would not have been obvious in view of the prior art as relied upon by the Examiner taken singularly or together, and that this rejection of claim 22 is improper for at least these reasons.

Conclusion

Appellant respectfully submits that claims 15-22 would not have been obvious in view of the prior art as relied upon by the Examiner taken singularly or together. Appellant therefore respectfully requests that the final rejection of claims 15-22 be withdrawn, and that these corresponding claims be passed to issue.

In the event that there are any outstanding matters remaining in the present application, please contact Andrew J. Telesz, Jr. (Reg. No. 33,581) at (571) 283-0720 in the Washington, D.C. area, to discuss these matters.

The required fee of \$500.00 under 37 C.F.R. 41.20 for filing this Appeal Brief should be charged to Deposit Account No. 50-0238.

Pursuant to the provisions of 37 C.F.R. 1.17 and 1.136(a), the Applicant hereby petitions for an extension of two (2) months to August 11, 2007, for the period in which to file an Appeal Brief. The required fee of \$450.00 should be charged to Deposit Account No. 50-0238.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment for any additional fees that may be required under 37 C.F.R. 41.20 or 37 C.F.R. 1.17 and 1.136(a), or credit any overpayment, to Deposit Account No. 50-0238.

Respectfully submitted,

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Appendix - Claims on Appeal

Claim 15: A method for eliminating a harmful substance from an organic exhaust gas, comprising:

- providing the organic exhaust gas including the harmful substance;
- contacting the organic exhaust gas with a treating liquid so as to dissolve the harmful substance into the treating liquid and provide treated exhaust gas;
- providing a biological filter medium supporting bacteria, the biological filter medium having opposite first and second surfaces; and
- supplying the treating liquid containing the harmful substance to the biological filter medium from opposite first and second directions to the opposite first and second surfaces, so that the harmful substance is biochemically degraded by the bacteria supported by the biological filter medium.

Claim 16: A method for eliminating a harmful substance according to claim 15, wherein the bacteria are aquatic microbes.

Claim 17: A method for eliminating a harmful substance according to claim 15, wherein the bacteria are selected from a group consisting of genus Zoogloea, genus Bacillus and genus Pseudomonas.

Claim 18: A method for eliminating a harmful substance according to claim 15, further comprising contacting the treated exhaust gas with an active carbon so as to absorb the harmful substance remaining in the treated exhaust gas into the active carbon.

Claim 19: A method for eliminating a harmful substance according to claim 15, wherein the treating liquid is circulated only in a system for treating an organic exhaust gas comprising at least the gas-liquid contact process and the biochemical degradation process.

Claim 20: A method for eliminating a harmful substance according to claim 15, further comprising supplying bubbled air throughout the biological filter medium,

Claim 21: A method for treating an organic exhaust gas comprising:

- generating an organic exhaust gas containing a harmful substance;
- providing a treating liquid;
- contacting the organic exhaust gas with the treating liquid so as to dissolve the harmful substance into the treating liquid and provide treated exhaust gas;
- contacting bacteria with the treating liquid containing the harmful substance so that the harmful substance is biochemically degraded;
- contacting the treated exhaust gas with an active carbon so as to absorb the harmful substance remaining in the treated exhaust gas into the active carbon; and
- supplying bubbled air to the bacteria.

Claim 22: A method for eliminating a harmful substance from an organic exhaust gas, comprising:

- providing the organic exhaust gas including the harmful substance;
- contacting the organic exhaust gas with a treating liquid so as to dissolve the harmful substance into the treating liquid and provide treated exhaust gas;
- preparing carriers supporting bacteria;

contacting the carriers with the treating liquid containing the harmful substance so that the harmful substance is biochemically degraded by the bacteria supported by the carriers;

contacting the treated exhaust gas with an active carbon so as to absorb the harmful substance remaining in the treated exhaust gas into the active carbon; and supplying bubbled air to the carriers supporting the bacteria.

Evidence Appendix

No evidence has been submitted under 37 C.F.R. 1.130, 1.131, or 1.132, or entered by the Examiner in connection with this pending Appeal. Thus, there are no copies of evidence included in this Appendix.

Related Proceedings Appendix

There are no Appeals or Interferences that may be related to, directly affect, or be directly affected by or have a bearing on the Decision by the Board in this pending Appeal. Thus, there are no copies of decisions included in this Appendix.